Delta Flows,
Salinity and Water Quality

Delta Challenges Workshop

"For every complex problem, there is an answer that is clear, simple and wrong." H.L. Mencken

Unfortunately, there are usually many
clear, simple and wrong answers.

March 16, 2005

Some things we can do well:

- Local measurements (Eulerian) of salinity, temperature, turbidity and flow (USGS, DWR, USBR, IEP)

- Modeling flows, water stage (surface elevation) for given inflows, diversions, tides

- Modeling salinity transport for given flow conditions

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Some things we could do (but don't):

- **Measure local diversions**
  - **Few diversions are measured, fewer reported in real time.**

- **Measure discharge volumes and quality (POTWs are measured, not reported in real time)**

- **Incorporate other factors that affect flow and salinity (wind shear, atmospheric pressure, bathymetry changes) to improve models**

Some things we cannot do:

- **Predict effects of sealevel rise**
  - **Requires knowledge of what the response will be: what areas will flood and what areas will be protected from additional flooding**
  - **So complex, "bookends" cannot even be established**

- **Predict climate change beyond general statements like more rain, less snow, more severe wet and dry periods**

Examples of complexity

• Salinity-flow relationships change with time—but not all (multiple factors at play)

• Measuring mean flow is extremely difficult and cannot be checked without measuring hundreds of diversions and discharges in real time, yet it is an extremely important factor

• Habitat restoration changes: very careful and complex modeling required to understand (and then they still need field verification)

What does all that add up to:

• We have a general idea of what affects flows and how salt (and other dissolved, passive, conservative pollutants) will move

• We can forecast generally, but not accurately, future salinity levels based on flow forecasts, but only to the extent we can estimate certain factors

• Our forecast abilities are better than most, but still not adequate to what is needed.